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a hall stand or a buffet would serve as an ornamentation that would rival the more delicate, but equally striking classic heads, to which we have already directed attention, in the same position.

Leaving the age of human and and animal representation exclusively, we approach the Middle Ages, where there was a style that was truly eclectic, for there were mingled in the most reckless manner graceful foliated designs with grotesque and questionable devices, human figures of every grade, costume and occupation, animals and monsters of all kinds, displaying the most vivid and teeming imagination, but the freedom and boldness of the execution have rarely, if ever, been surpassed.

The form of classic heads was in a great measure abandoned, and the arrangement of the hair in "lumps" (as Mr. Moody terms it), was not popular, nor did the curiously twisted, corded, rope-like locks of the Assyrian find favor in the eyes of the more modern artist. Heads with fabulous associations were devised, human skulls with the beak of a bird or with the body of a fish or serpent, animals with impossible muscles impossibly developed, in truth there was but one limit to the ornamental forms of the age, and that laid in the fertility of the artist to invent fabulous and eccentric designs.

It is difficult to write upon this phase of Decoration without referring to Grinling Gibbons, whose admirable and altogether unique work has been lasting and brilliant in its effect.

The cuts upon page 153 contain some hints for carvers that are worthy of being followed. The sprigs or branches sustaining the pears and apples are roughened, knotty, worm-eaten, such as are natural, not conventional, twigs and bark and wood. The average finish to the carved leaf of to-day displays exaggerated veins and fibres upon the upper side, and a slight, very slight, bevel about its edges, a bevel by no means sufficient to deceive the most casual observer into the thought that the leaf is of a different piece to the background, and a bevel that adds to, rather than lessens, the appearance of weight and clumsiness. The most delicate flower in nature is by such treatment made bulky and heavy, and its stem, ending abruptly, shows a harsh termination that is far from esthetic, or even artistic, and certainly not pleasing. Grinling Gibbons would experience peculiar feelings to see the good results that have followed his excellent efforts. His reputation rests in some measure upon the fact that he freed himself from the hide-bound traditions of his craft, and applied new ideas to old principles. A leaf with him was what nature made it, not what some mentally impecunious "old master" in wood-carving decreed it ought to be, and the result was that he portrayed nature and nature's peculiarities and attributes. A delicate flower was delicate in the carving, and was suspended from a fragile stem; a twig was not a reproduction of a gas-pipe, but had the features and details of its natural growth; a knot was such a one as you can find on any tree within reach, it was not the nondescript that is now made, with its regulation wrinkles and creases, very much of the character of the burl and graining found in the majority of furniture plates and catalogues.

Gibbons ignored the conventional and carved with a bold touch; chiseled all about his figures, so that the most prying eye could barely discover the connection between the background and the ornament; his fruit was laid on, not cut out, and it would be an immeasurable advantage to the "large majority" of wood-carvers of this particular era if they would visit St. Paul's, or Petworth, or even Windsor Castle, and endeavor to inhale some of Grinling Gibbons's originality.

Walpole says of Gibbons: "There is no instance of a man before Gibbons who gave the wood the loose and airy lightness of flowers, and chained together the various productions of the elements, with a free disorder natural to each species. So delicate was his workmanship that he carved a pot of flowers that shook in the room with the motion of the coaches passing in the street. There is some foliage by him in Windsor and in the Choir of St. Pauls, besides chimney-pieces and picture frames, where dead game, flowers, and foliage almost deceive the eye into a belief of their reality. His heads of cherubs and productions of a similar nature, possess a sweetness of expression, and an angelic loveliness, which, as long as they exist, will render them the admiration of all lovers of ideal beauty."

CONCERNING COLOR THEORIES
AND
THE GENERAL HARMONY OF COLOR.

By Geo. Curtis Wright.

THE main points in recent color theories having been noted, our attention may be directed to the principal features deduced from the theory of Thomas Young, as modified and set forth by Helmholtz and Maxwell.

It is a well-known fact that very close representatives of all colors can be produced by the use of very few pigments. For example, crimson lake, gamboge and Prussian blue (red, yellow and blue). The red and yellow mixed in various proportions will furnish different shades of orange and orange-yellow; the blue and yellow, various shades of green; the red and blue, all the purple and violet hues.

Some of the most noted painters in water-colors have used only these three colors in painting, adding black for the purpose of darkening them to produce browns and grays.

A more profuse palette would enable the painter to produce very brilliant representatives of the hues of nature, yet very satisfactory substitutes can be produced with the colors mentioned above. These facts were known at a very early period in the history of painting, and furnished the foundation for the so-called theory of three primary colors—red, yellow and blue. Sir David Brewster, noted for his many wonderful optical discoveries, maintained that there were three original or fundamental kinds of light—red, yellow and blue—and that by their mixture in various proportions, would produce all other kinds of colored light, after the manner of mixing pigments.

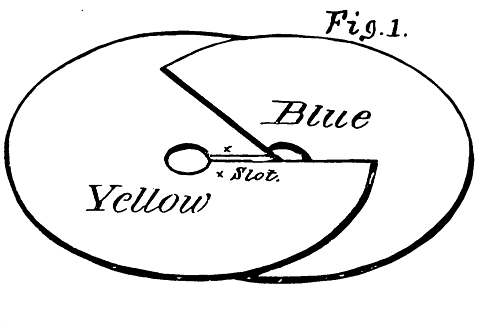


Fig.1.

On examining the matter theoretically, we find that it cannot be so, for outside and apart from ourselves there is no such thing as color, but a mere sensation that varies with the length of the wave producing it. Light consists only of waves, long and short—simply mere mechanical movements. Brewster's theory would imply that there were in the spectrum only three sets of waves, having three different lengths, which is not true.

According to the theory now under consideration, green light is produced by mixing blue and yellow light. Maxwell's disks furnish us with a simple means of mixing light of different colors, and is quite within the reach of all who are interested in this subject. A circular disk, painted with chrome yellow and provided with a radial slit, is to be combined with one prepared in the same way and painted with ultramarine blue.

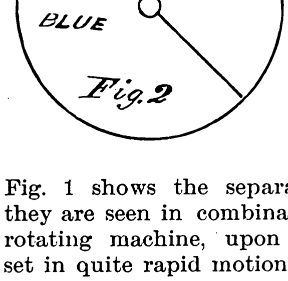


Fig.2

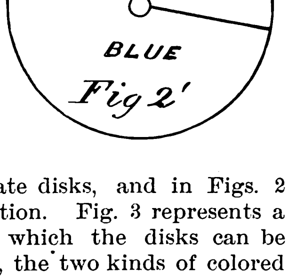


Fig 2'

Fig. 1 shows the separate disks, and in Figs. 2 they are seen in combination. Fig. 3 represents a rotating machine, upon which the disks can be set in quite rapid motion, the two kinds of colored light being mingled the resultant tint will not be green, but a yellowish gray or reddish gray, according to the proportions of the two colors.

The experimenter can mingle the two colors in any proportion desired; but, vary the proportions as he may, it will be impossible to obtain a green hue, or anything approaching it. Another simple experiment, within the reach of all, is to use a piece of fine window or plate glass, which is to be supported in a vertical position, ten inches above a black surface. On either side of the glass the colored papers are placed. The blue paper will be seen directly through the glass, while the light from the yellow paper is first reflected from the glass and then reaches the eye.

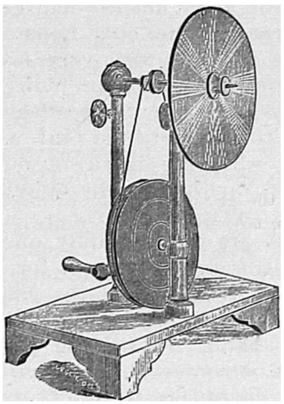


FIG. 3.

The two images are seen super-imposed, as shown in Fig. 4. By moving the papers forward and back the relative luminosity can be varied at will. In one case the blue predominates, and in the other the reverse effect ensues.

All these changes will correspond to those obtained with the two circular disks. As will be observed in this experiment no tendency to green occurs. In using a more refined apparatus, the union of pure blue with the pure yellow light of the spectrum produces in the eye a sensation of white light, but not of green.

It is evident, therefore, that a total failure to produce green light by the mixture of blue and yellow light is fatal to the hypothesis of Brewster.

In observing an artist at work, we wonder at the skill and knowledge he displays in matching any color which is within the compass of his palette. We soon find, by closer observation, that the matter is more complicated than it appeared at first sight, each pigment having a particular set of properties which it carries into its mixtures, and these properties being by no means fully indicated by its mere color. Some blue pigments furnish fine sets of greens, while others as beautiful and intense, yield only dull olive greens; some reds give glowing purples, while from others, not less bright, only dull, slaty purples result. The mixture of pigments in some cases gives results similar to those produced by mixing colored lights, but generally they differ, sometimes enormously.

In conducting these experiments satisfactorily, recourse must be had to the pure colored rays of the spectrum. The difficulties encountered in the use of this method are much greater, but the results so obtained are more valuable.

By mixing two kinds of pure-colored light we obtain usually a light having a color different from either of the original ingredients—red and yellowish-green give an orange hue, which looks in all respects like the pure orange of the spectrum; also in this new orange it is impossible for the eye to detect the presence of either red or yellowish-green light. This is true of all mixtures; in no case can the original colors be detected.

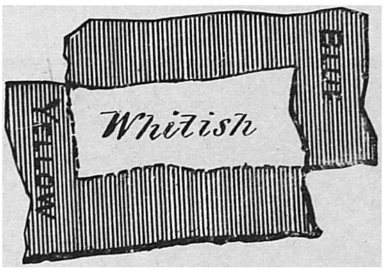


Fig. 4.

The same color can be produced in several ways by combining different pairs of spectral colors. Thus, violet with greenish-blue produces an ultramarine hue, but violet gives the same color when mixed with bluish-green, or even with green; in the last case the tint is somewhat whitish. Furthermore, mixtures of certain colors of the spectrum give rise to white; this is true, for example, of red and bluish-green, and of yellow and ultramarine blue. The white, though so different in origin, has exactly the same appearance to the eye.

Such is the general character of the results obtained by mixing together masses of pure colored light.

Maxwell's disks (Figs. 1 and 2) enable us by an easy method to pursue our color investigations without having direct recourse to the spectrum (these experiments must be conducted in daylight), and will show the wide difference between the effects produced by mixture of light and mixture of pigments.

Fig 5.

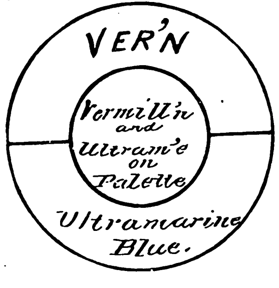


Fig. 5 represents two disks separately painted, one with vermillion, the other with ultramarine-blue. A smaller disk (single) is painted with a mixture on the palette of equal parts of vermillion, and the other with ultramarine-blue. Place the disks on the rotating apparatus as arranged in Fig. 5, the vermillion and ultramarine covering each one half of the larger disk, the smaller one, exhibiting the result furnished by the palette, being placed in the center. When the compound disk is rotated, the colors of the outer portion undergo true mixture; it is easy to compare the resultant tint with that furnished by the palette. In this experiment the result was as follows: The larger disk became tinted red-purple, the smaller disk appearing gray and dull. The true color of the smaller disk was a dull violet-purple. It was noticed that not only was the color much darker and less saturated, but it had been changed, apparently, from a red-purple to a violet-purple. In order to ascertain how much the pigments had been darkened by mixture on the palette and otherwise changed, a black disk was combined with the vermillion and ultramarine-blue disks, and various amounts of black introduced into the red-purple mixture by rapid rotation. It was found impossible in this way to bring the color of the larger disk to equality with that of the smaller one, it remaining always too saturated in hue. A white disk was then added to the large one, and equalization finally effected. It was found, by placing a graduated circle (divided into 100 parts) around the disks, that twenty-one parts of vermillion, twenty parts of ultramarine, with fifty-one parts black and nine parts white, made a tint by rotation which was identical with that given by mixing the vermillion and ultramarine on palette.

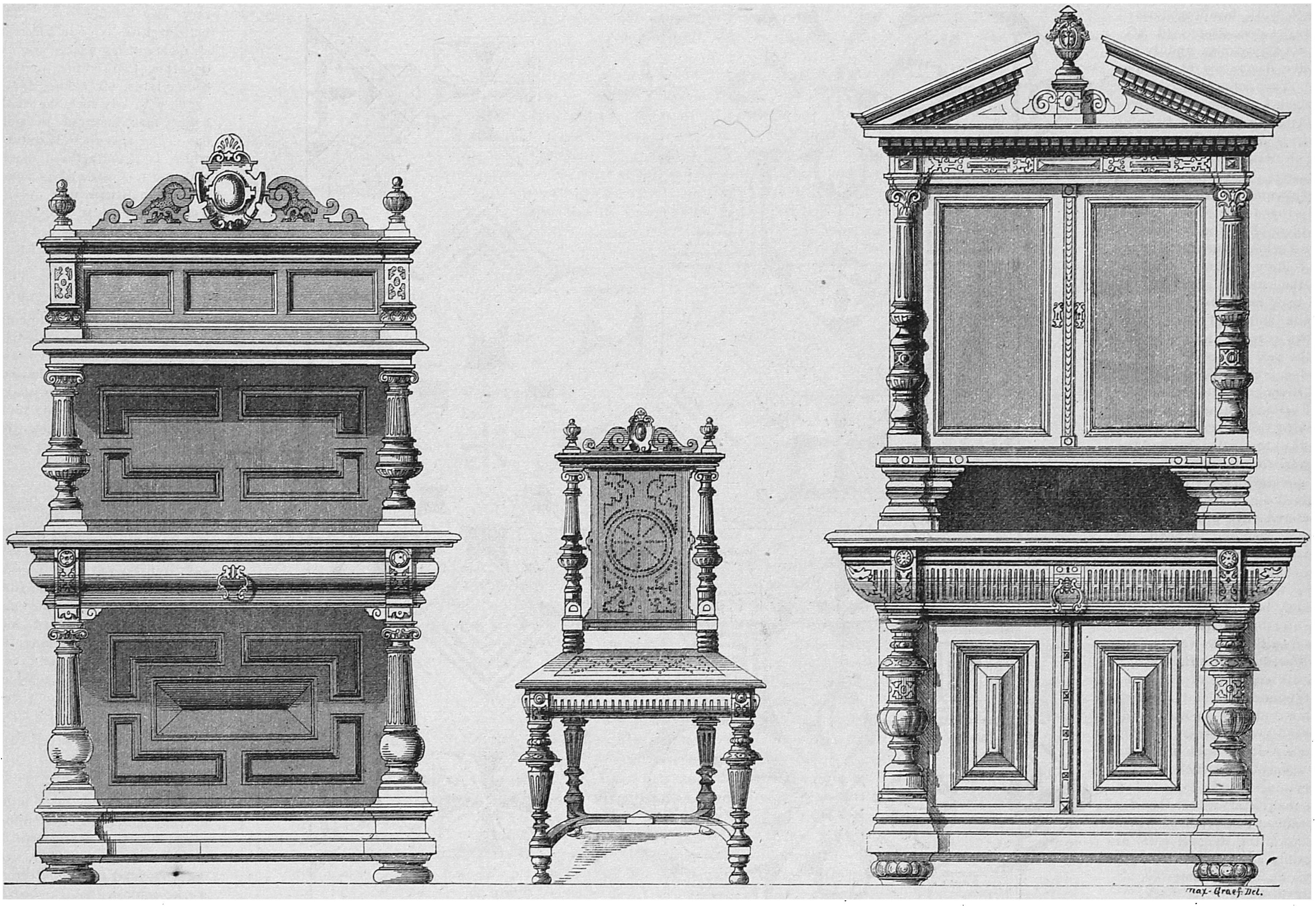
The great amount of black necessary to add, forcibly illustrates the fact that all mixture of pigments by the painter is a step toward blackness.

Table showing the effects of mixing pigments by rotation and on a palette:

PIGMENTS.	ROTATION.	PALETTE.
Violet-carmine Hooker's green	Yellowish-gray	Brown.
Violet-carmine Gamboge	Pale Yellowish gray	Sepia gray.
Violet-carmine, Prussian-blue and Gamboge (mixed to bright green)	Greenish-gray	Gray.
Violet-carmine Prussian-blue	Blue-gray	Blue-gray.
Violet-carmine Carmine	Pink-purple	Dull red-purple.
Gamboge Prussian-blue	Pale greenish-gray	Full blue-green.
Carmine Hooker's green	Yellowish-orange	Brick-red.
Carmine Green	Pale-reddish (flesh tint)	Dark-red.

In only one case do the results of the two methods coincide; in all the other tints from palette a duller and darker (sometimes otherwise different) hue was obtained.

Color equations for the cases above enumerated can be obtained with the scale in the manner described for vermillion and ultramarine-blue. How much black it is necessary to introduce, and how far the proportion of the two component colors must be varied, can be readily determined.


Max-Graef-Del.

EXAMPLES OF GERMAN WORK. CABINET, SIDEBOARD AND CHAIR.

The amount of black necessary to introduce, in order to darken the *true mixture* of the colors so as to match the mixture of pigments, is a variable quantity. For this reason, artists are very particular in their selection of pigments for the production of definite tones, especially when they wish luminosity. In more than half the cases examined, the original colors were found incapable of reproducing, by a true process of mixture, the tint obtained on palette without the aid of other colors.

It will be found, then, that the results furnished by the palette are unreliable as guides in studying the effects in nature, depending on the mixture of colored light.

A Handsome Curtain or Lambrequin, to be fastened to the bottom of the lowest shelf on a hanging ebony cabinet, is made of olive satin. It is about ten inches deep; a vine is painted on it of bright but small flowers; the edge is trimmed with a velvet band; it is straight at the lower edge, but scalloped at the upper. It should be run on at the bottom, then turned, and the scalloped part blind-stitched on. The scallops may be ornamented by putting several rows of yellow silk around them. Catch the silk at short distances with black or scarlet silk.

RESOURCES IN UPHOLSTERY.

By Miss E. T. Lander.

In houses of the most approved style, and where all the different objects which may be grouped together to complete a harmonious whole are usually each considered as a separate study, it is also becoming frequent for almost every ordinary seat to exhibit to some degree a distinct character. Even when the same general order of form may be maintained in the furniture of any apartment, the effects are peculiarly varied by a multitude of fancies in the finishing decoration. The results are beyond anything which could have been readily imagined before the reigning spirit of decorative art had become aroused, as it is, to the infinite purposes it pursues.

With everything in nature and art under tribute to this deity of decoration, the exaction is in no point abated in the matter of furniture, and all that prolific fancy can invent either for novelties of fabric, of modes of application, or of ultimate garniture, is united with the utmost variety attainable in form and in the treatment of the many fine woods which may be used. With the gain of experience each householder becomes more and more a law unto himself, subject to but a single fretting restriction, which of course in a majority of cases forbids the use of fine needlework tapestries or other materials costing $150 per yard, like the rich Moorish brocades in blue and red and gold, or an embroidered silk of the time of Marie Antoinette (not copied but absolutely of that date) used sparingly in even the palace home to cover perhaps one small chair in a room. Persian embroidery work, however, is admirably imitated in many of the raw silks with gold or silver intermingled, and in French lampas in soft and glowing colors almost equal to the real Persian production itself. In faint blue and silvery tints the latter is used most effectively with yellowish woods. Genuine tapestries of the finest class, as the Gobelins, or those from the Aubusson or Beauvais works, are used most frequently in connection with deep toned woods of choice varieties; such as Circassian walnut, Santo Domingo mahogany, or German walnut, and this upholstery material is thought well suited to the Renaissance style of furniture, either Italian or French, particularly the latter. The red mahogany furnishes as good a framing as could be desired for a needlework tapestry wrought in rectangular medallions, for application to seat and back in old softened colors. A Napoleon I. set, covered with heavy Roman silk tapestry, is, appropriately, in rosewood with each chair differing from all the others.

The Aubusson and other real tapestries are frequently copied from flower paintings and these are used both for furniture covering and for panels. All this art imitative feature is reproduced again with the cheaper fabrics as exemplified in a Henry VIII. arm chair with blue jute tapestry designed with figure and landscape scenes for the seat and back. Tapestries are much used also in combination with plushes, the latter most frequently forming a background for an appliqué, or a framework in the usual way in bands around the seat and in covering the arms. A silk tapestry with yellow predominating is found effective with capucine and equally so with blue. Another style is shown in a cushion chair with special designs in dull red tapestry applied at the back and seat on red plush, decorated with chenille, rich knotted fringe and *nœuds* at the corners. A pleasant arm chair with bronze cherubs supporting the arms is upholstered in tapestry of silver ground figured with olive, light blue and old red, and having the front of the seat curtained by a drapery of old blue plush, bordered with tasseled fringes uniting the tapestry colors, and over which falls a blue silk open netting scolloped at the lower side and edged with chenille drops. The fine effect to be gained by uniting tapestry with other materials is noticeably illustrated by a Louis XV. style of appliqué embroidery in plush and gold on a groundwork of tapestry and satteen.

As now perfected in manufacture the rich silk velour which is worth $75 per yard is one of the most beautiful materials used in upholstery. After its weaving in the Jacquard loom this is embroidered by hand to represent, in old colors, an antique stuff. Its surface presents three depths, with colors exquisitely involved, and its sheen in repeated gradations—a rare thing indeed for suggestion of the beauties of nature and of secluded rest, with dreamy fancies. Another material on an equal scale of luxury is a rich silk brocade suited for a Louis XVI. style of furnishing, which is woven a second time by an embroidery machine designed for this special use. Rich Japanese fabrics with gold-seeded or gold-threaded grounds and an infinitude of design are occasionally used, and much more frequently may be seen their numberless imitations in inexpensive raw silks. Semi-Turkish furniture is upholstered with Turkish materials, and extensive use is made of saddle-bag coverings for sofas and chairs of various styles. When the latter are real—by which is understood that they have served originally as depositories for goods conveyed on the backs of camels—they rank as antiques. These are imported as made, and consist of two square pockets of rug fabric applied at either end of the strip of coarse material which forms the background. Strong loops are attached at little intervals along the upper edge of each receptacle to allow its being fastened. The whole is retained in upholstery, as for a library chair, which is furnished with brass knobs at the top to which the saddle-bag loops are attached. The remaining pocket in a similar manner covers the seat, and a full drapery of blue plush, starting from the back at either side, is brought forward and drawn in front through a brass ring which is suspended from the mouth of a lion at the end of the arm. Pieces of these shapes and also of sofa lengths, which are not bags and which are frequently called Arabs, appear in great abundance, being in velvet Wilton and Scotch manufactures, as well as in Eastern styles. They are extensively used in service for libraries and back parlors.

The popularity of tapestry and velour is in no way a detriment to that of plush, as the desire for fine and various furnishing evidently grows by what it feeds on. The latter material, both in the plain and embossed styles, is used in every imaginable color, among which most prevail those of terra cotta, crushed strawberry, chocolate, old gold, capucine, peacock blue, light blue and shrimp red. Stamped plushes are